

CERTI Project Report

**Impact of Cross Functional Interdisciplinary Team Structure
and Immersive Learning Environment on Students' Perception
of Learning Experience, Engagement, and Course Satisfaction**

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Abstract: This study assesses student perceptions regarding working in teams across two courses: Masters in Business Administration (MBA) Managerial Accounting, and Enterprise Resource Planning (ERP). A team of MBA students was partnered with a team of ERP students to work on a project. The project simulated a working environment where members of the accounting department have to work with members of the ERP department. The students were given a case study of a company that produces breakfast cereals in Germany. The ERP team was responsible for deciding on the product mix, production and marketing of the cereals. The MBA team provided product costing and breakeven analyses to the ERP team. The ERP team went through four simulation runs as they adjust their production to changing market demands and raw materials costs. We administered a personality survey at the beginning of the semester, and a post-survey at the end of the semester to assess student experiences in an immersive learning environment and working in cross-functional interdisciplinary teams.

Keywords: cross-functional teams, interdisciplinary project, psychometrics, personality traits, student engagement, active learning

Impact of Cross-Functional Interdisciplinary Team Structure, Immersive Learning Environment, and Personality Traits on Students' Perception of Learning Experience, Engagement, and Course Satisfaction

I. INTRODUCTION

This study assesses student perceptions regarding working in teams across two courses: Managerial Accounting, and Enterprise Resource Planning (ERP). One team consisted of Masters in Business Administration (MBA) students taking Managerial Accounting, and the other team consisted of graduate and undergraduate students taking ERP classes. The students were assigned to work on a project that simulated a working environment where members of the accounting department have to work with members of the ERP department. The students were given a case study of a company that produces breakfast cereals in Germany. The ERP team was responsible for operating a live SAP ERP system to make product mix decision, execute production, and market and sell cereals. The MBA team provided product costing and breakeven analyses to the ERP team. The ERP team went through five live simulation competitions during the semester as they adjusted their production to changing market demands and raw materials costs.

The objectives of the research are to examine student assessments of (1) an immersive learning environment; (2) working with teams across disciplines. Therefore, a personality survey was administered at the beginning of the semester to collect data on student personality traits. A survey was administered at the end of the semester to assess student experiences in an immersive learning environment and working in cross-functional interdisciplinary teams.

The immersive learning environment was provided by each of the ERP simulation competition where the ERP team operated a live SAP ERP system and executed transactions. They made purchases of raw materials, executed production orders, sold products to the market, and made capital investments. For the Accounting students, they were given cost data of raw materials, direct labor and overhead and derived product costs. They also used the cost data to determine breakeven analyses.

II. LITERATURE REVIEW AND RESEARCH OBJECTIVES

2.1 Interdisciplinary Teams

A cross-functional interdisciplinary team is a common workplace practice that utilizes different functional expertise among members to achieve a common goal for the organization. Studies have suggested increased creativity, improved problem solving ability, higher synergy, and more frequent interactions in a cross-functional team environment because of diversity of experience, expertise, and knowledge among team members. With globalization, team members are often located in different geographical locations. Therefore, the ability to work in a cross-functional and virtual team environment is a critical skill and has become a professional development requirements in today's any workplace.

Rekonen and Bjorklund (2016) found that familiarization with capabilities of members is critical in front-end innovation process while heterogeneity of team might be a limitation. Yousef, Koenek, Kenyon, Hamby and Eaglin (2014) utilized a capstone project to addresses collaboration between School of Engineering Technology and School of Management and found that interdisciplinary team structure expands student understanding and achievement among disciplines, reduce the gap between industry requirements and academic learning, but extra time to coordinate project, effort may not be sustainable throughout the organization.

Therefore, one of the objectives of this research is to seek insights to determine if working in interdisciplinary teams improve students' perception of learning experience, engagement and course satisfaction.

2.2 Immersive Learning Environments (ILEs)

With advances in information technology, Immersive Learning Environments (ILEs) has evolved from a language learning technique into an emergent trend in education. Gartner, a leading IT consulting firm, defines ILEs as "learning situations that are constructed using a variety of techniques and software tools, including game-based learning, simulation-based learning and virtual 3D worlds." ILEs engage learners through utilizing theories and techniques from active learning, experiential learning, peer learning, and gaming. ILE provides learners with realistic scenarios and environments to practice skills, learn concepts, and interact with other learners.

Hornik and Thornburg (2010) reported greater student performance in a first-year financial accounting course taught in an immersive virtual world that uses an interactive accounting equation and t-account model. Geithner and Menzel (2016) found improved conceptual knowledge, teamwork and soft skills in a business simulation game. Scullion, Livingstone and Stansfield (2014) reported enhanced communication, collaboration and teamwork in online 3D environment. Tunstall and Lynch (2010) reported that students found electronic simulation case studies were more engaging and felt “real”.

Therefore, the second objective of this study is to investigate if an immersive learning environment improves students’ learning perception of experience, engagement and course satisfaction.

2.3 Psychometrics

A variety of cognitive ability tests have been widely used for selecting employees and predicting job performance (Spearman, 1904; Rowan, 1957; Lilienthal & Pearlman, 1983; Schmidt, et. al., 1992) as well as predictors for academic success (Rowan, 1957). The Big Five Personality Test is one of widely adopted cognitive ability tests that organizes personality traits into five distinct categories: Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness (Mirza et al. 2015). The mini-IPIP is a 20-item short form of the 50-item International Personality Item Pool of the Big Five test (Goldberg, 1999; Mirza et al. 2015) and has also been extensively studied and proven to have acceptable internal consistencies similar to the larger Big Five Personality test (Donellan, 2006).

Higgins et al. (2007) indicated that dorsolateral prefrontal cognitive ability correlates with supervisor ratings of managerial performance, academic performance, and conscientiousness. Studies found that cognitive ability is a stronger predictor than supervisory ratings for job performance (Lilienthal & Pearlman, 1983; Pearlman, 1979). Researchers also found that extraversion predicts learning styles; neuroticism negatively related to academic success, conscientiousness predicts academic performance, and openness (intellect imagination) and agreeableness foster collaborative learning (Chamorro-Premuzic & Furnham, 2003; Conard, 2006; Poropat, 2009, Komarraju et. al., 2011). Openness (intellect imagination) is reported to positively correlated with learning style (Vermetten et al., 2001), learning motivation (Tempelaar, et al., 2007), and critical thinking (Bidjerano & Dai, 2007). Agreeableness often has positive impact on academic performance ((De Raad &

Schouwenburg, 1996, Vermetten, et al., 2001, Poropat, 2009).

As the personality traits have not been utilized as predictors of Accounting or ERP learning performance in prior studies, the third objective of this research is to seek insights if personality traits affect students' perception of course performance, engagement and course satisfaction.

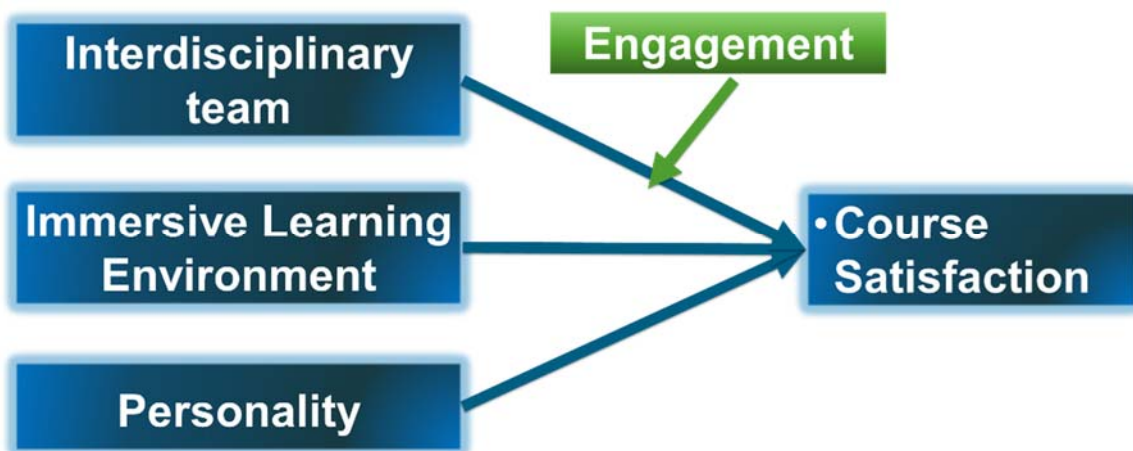
III. RESEARCH QUESTIONS & RESEARCH MODEL

Following three research questions were derived based on literature review:

1. Does an immersive learning environment improve students' learning experience, engagement and course satisfaction? The immersive learning environment is constructed using a live ERP business simulation game.
2. Does working in interdisciplinary teams improve students' learning experience, engagement and course satisfaction? The interdisciplinary team is formed by accounting students and ERP students.
3. Does personality traits affect students' course performance, engagement and course satisfaction? The personality traits for a student is determined using the mini-IPIP survey.

The resulted research model is provided in Figure 1:

Figure 1 Research Model



The immersive learning environment will be observed from ERP class where the live company operation is used for as the class project and as the interdisciplinary team project. The interdisciplinary team include students from both classes and will be formed by the instructor to balance demographic factors. The personality is assessed through the mini IPIP personality survey.

Course satisfaction data will be obtained from standard course evaluation from Spring 2017 (experiment group) and Spring 2016 (control group). Course grade in numerical form will be collected from Spring 2017 class (experiment group) and Spring 2016 class (control group). Simulation user log files with time spent on each activity/transaction will be collected throughout the experiment period as objective measure of student engagement. The objective engagement measure will be compared with self-reported engagement level collected from the survey.

IV. RESEARCH DESIGN

4.1 Course and Student Subjects Selection

One ERP class, System Configuration, one MBA accounting class Managerial Accounting and Control, and 10 undergraduate ERP students are included in this study. Five pedagogical issues and problems observed in current form of teaching from both classes are described below and summarized in Table 1:

1. **For ERP students:** The current semester project has a comprehensive large-scale simulated manufacturing environment and requires significant business knowledge from accounting, finance, operations, and marketing. Majority of ERP students are proficient in technical execution of the project, but often struggle to understand those business concepts that is outside of the scope of class. As a result, those future Information Technology (IT) workforces face the most common IT project implementation problem that is solving the wrong problems or implementing a solution that is not compliant with business processes.
2. **For MBA students:** The current semester project is a hypothetical problem set and students lack real data to work on the project. Students have to devote significant time in researching and finding data or to make up data for their project. The resulting projects are often relatively small in scope and has limited technology content to resemble the complexity students would have to face in a real world work place. That is, those future business managers are not exposed to large amount of accounting and financial data,

the complexity in interconnected work environment, and the information technologies commonly used in business areas.

3. For both classes, lower level of interactions and communications between on-campus students and distance students and between students and faculty throughout the semester.
4. For both classes, low level of self-motivated learning occur beyond what are covered in course plan.
5. For both classes, the motivation of taking additional classes in their respective subject/degree areas are low. This observation is especially significant in distance student population.

Table 1 Descriptions of Selected Courses and Student Subjects

Course	ERP System Configuration and undergraduate ERP students	Managerial Accounting and Control students
Nature of Course	highly technical content and students	business functional knowledge
	heavy technology usage	focus more on theories and models
	generate realistic and high volume business data	lower level technology requirement
Specific Challenges	Students have no or very limited business functional knowledge	<ul style="list-style-type: none"> • Need more technology applications • Lack realistic data for project
Common Challenges	<ul style="list-style-type: none"> • low level of self-motivated learning • motivation of taking additional classes in their respective subject/degree areas are low 	

4.2 Project Phases and Timeline

The research is conducted in five stages: Design, Model, Experiment, Analysis and Prototyping, and Research, as shown in Figure 2.

Interdisciplinary team experience was provided by pairing an MBA team with an ERP team. Each Accounting or ERP team consisted of three to six members, so each interdisciplinary team has 6 to eight members. The project was undertaken during Spring 2017 semester for a duration of 16 weeks of classes. The project was assigned during the first week of the semester and assignments were due at various points during the semester. Table 2 provides the timeline and major tasks during the project's experiment stage.

The seven competition teams, the five live simulation competitions, and team awards were all sponsored by a company including Investment Realty, Cargill, Centene, Deloitte SAP, Monsanto, Nextep Consulting, Novus International, Peabody Energy, RSM US, and Union Pacific,

Figure 2 Research Stages

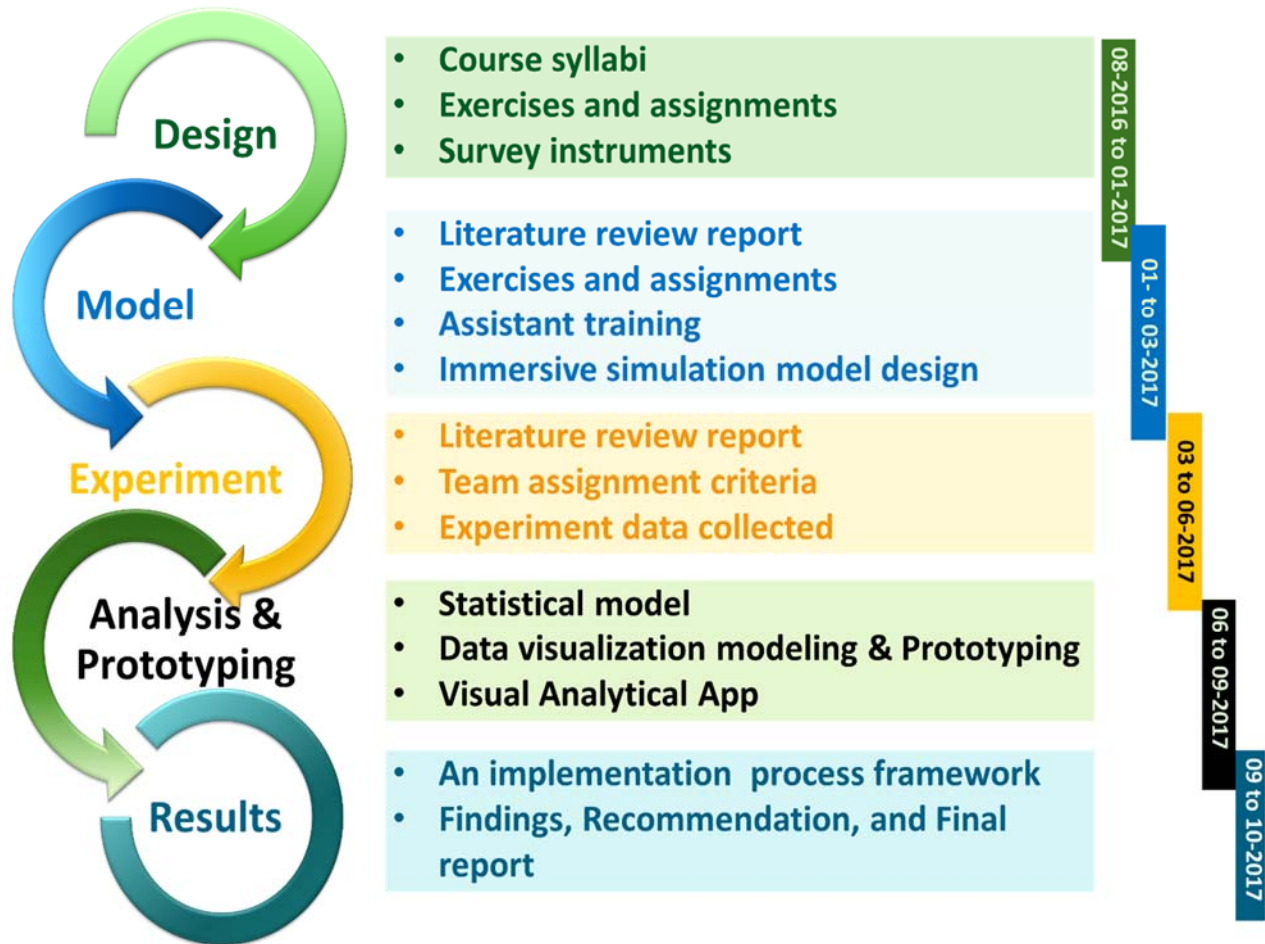


Table 2 Timeline and Major Tasks of the project

		BUS 6224	ERP6120	ERP Center
BUS 6224	ERP6120	8	6	2 teams (4 students each)
1	18-Jan			
2	23-Jan		Form Teams	Announcement
3	25-Jan			
		Form teams	case facts Quiz	
	30-Jan	1-Feb	Assign project assignment 1	
4				
	6-Feb	8-Feb		
5			Project team assignment 1 due on 2-15 (production plans to BUS6224 team to determine & validate product	Form teams
	13-Feb	15-Feb		
6		project 1: determine product cost based on ERP6120 team production plan	Project 2 Individual Accounting setup due 2-22	
	20-Feb	22-Feb		Workshop 1 (5:30-6:45, Accounting setup, Toomey 251
7		Project 1 Cost Analysis due 3-6 (provide cost analysis to ERP 6120 team)	Teams receive product cost from BUS6224 teams	Workshop 2 (5:30-6:45 pm, production setup, Toomey 251 lab)
	28-Feb	1-Mar	Teams (BUS6224 , ERP 6120, BUS3220) determine a Q1 Competition plan by March 8	
8			Individual Project 3 production setup due	Q1 Plan approved by 3/8
	6-Mar	8-Mar		
			Q1 setup period (3/8 - 12 noon, 3/12, correction period: 3/13-3/14)	
9			Simulation Q1 setup (ERP 6120, BUS6224, Center for ERP teams) due 12 noon, Sunday, 3/12, correction period: 3/13-3/14(BUS 6224 optional participation)	
	13-Mar	15-Mar	Q1 Live Simulation Competition (5:30-6:30, 3/15, Fulton 107A) with Advisory Board Optional presentation to the investor panel (Advisory Board): 3-16	
10		Project 2:CVP Analysis		
	20-Mar	22-Mar	Q2 Live simulation Competition (Th., 5:30 - 7:00, 3-23, Toomey 251)	
11			Spring break	
	27-Mar	29-Mar		
12				
	3-Apr	5-Apr		
13				
	10-Apr	12-Apr	Q3 Live Simulation Competition (5:30 - 7:00, Toomey 251, April 13) hosted by Deloitte	
14				
	17-Apr	19-Apr		
15			Q4 & Q5 simulation (Heavener Center, 11 am - 2 pm, April 28), hosted by Cargill	
	24-Apr	26-Apr		
16				
	1-May	3-May	May 3: ERP 6120 Project Presentation & Industry Award & Reception (optional: BUS6224, BUS3220, Center for ERP team)	

4.3 Joint Class Project Description

The joint class case was about a company producing breakfast cereals in Germany. In the initial phase, each ERP team was asked to decide on the product mix (regular, strawberry, nuts; each in large or small size) and three markets to sell in (grocery, hypermarket, and specialty stores). Figure 3 shows products mix settings and Figure 4 shows market settings.

Figure 3 Product Mix Settings



Figure 4 Market Settings

West		North	
Hypermarkets	3	Hypermarkets	2
Grocery stores	17	Grocery stores	19
Independent grocers	40	Independent grocers	45

South		Total	
Hypermarkets	7	Hypermarkets	12
Grocery stores	23	Grocery stores	59
Independent grocers	38	Independent grocers	123



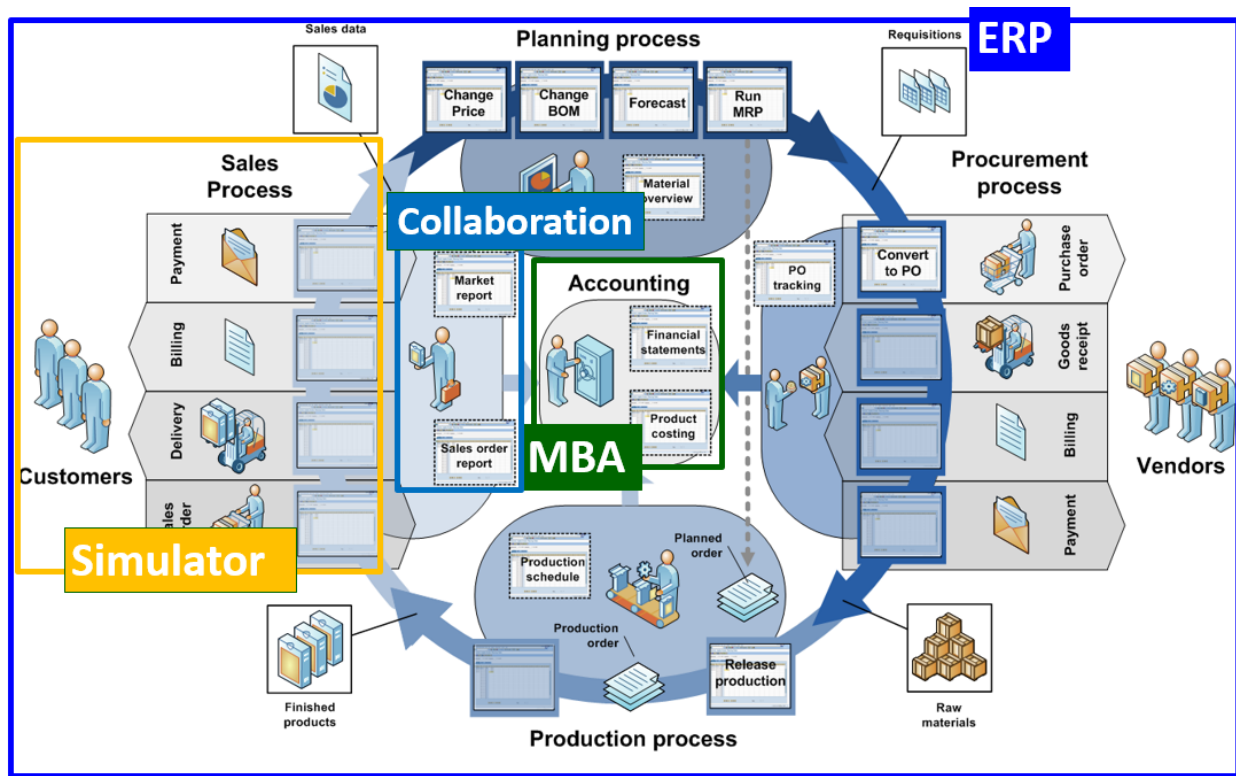
The case provided initial data on cost of raw materials, labor, overhead, selling and administration costs. Each ERP team determined and provided the overall business strategies, product mix, and Bill of Materials (BOM) to their MBA team members. The MBA teams then worked on product costing for each of the products and provided the product costing and suggested pricing data to the ERP team in week 8 after product costing had been covered in class.

The ERP teams gave business strategy presentation to a 9-member industry judge panel and two course instructors in Week 9. The ERP teams and some of their MBA team members then participated in the first and second simulation exercises in weeks 9 and 10 where they had to make decisions on purchasing, production, and selling in response to changing customer demand and market prices on raw materials during the live competition.

In the second phase, the MBA team worked on multi-product breakeven analyses in week 11 of the semester after breakeven analysis had been covered in class. The third and fourth simulation exercises were conducted in weeks 13 and 15. After each simulation exercise, the students can extract sales and production reports that represent actual results. In the final report, the students use the plan data from the first phase and actual data from the second phase to discuss product costing, cost-volume-profit analysis, and budgeting and variance analysis. Figure 5 shows business processes and tasks performed by ERP teams, MBA teams, and collaboration between ERP and MBA teams.

A separate project presentation was required for both MBA team and ERP team during the final class week and students from both classes are invited to both accounting and ERP presentations. The accounting students presented their project and learning experience to their accounting faculty and the involved ERP faculty. The ERP students presented their project and learning experience to a 20-member industry judge panel and two course instructors.

Figure 5 Business Processes and Tasks Responsibilities



4.4 Data collection

To examine the research questions, we administered two surveys to the students. The first survey was a personality survey that was administered at the beginning of the semester. The personality survey included demographic and 20 standard mini-IPIP questions. Demographic data includes gender, ethnicity, year in school, self-reported technology level, subject knowledge level, GPA, and other relevant data. The survey is deployed via the Canvas Learning Management System and is provided in Appendix 1.

The second survey was to collect student perceptions on the joint class project and was administered during the last week of the semester. The first section had questions about working with team members from their class. The second section had questions about working with team members from the other discipline. Appendix 2 contains the survey questions for the Managerial Accounting students. The feedback survey for ERP students is provided in Appendix 3.

V . RESULTS AND PROJECT ACCOMPLISHMENTS

5.1 Descriptive Statistics

Data were collected from 59 students including 26 female and 33 males in Spring 2017 semester. Among the 59 students, 28 are in an ERP class and 31 are in an MBA class. The majority of ERP students are graduate students (50%) and seniors (35.7%) who are in younger age groups than MBA students are. The primary degrees for ERP students are Information Science & Technology (IST) (46.4%), Business Management Systems (25%), and Engineering Management (14.3%). The primary degrees for MBA class students MBA (74.2%), IST (12.9%), and Business Management System (9.7%). The detailed distributions by gender, year in school, age, and degree are provided in Table 3.

Table 3 Subject Distribution by Gender, Year in School, Age, and Degree

Demographic Factors		Discipline				Total
		ERP Class		MBA Class		
Gender	Female	12	(42.9%)	14	(45.2%)	26
	Male	16	(57.1%)	17	(54.8%)	33
	Total	28		31		59
Year in School	Graduate	14	(50%)	28	(90.3%)	42
	Junior	3	(10.7%)	0	(0.0%)	3
	Senior	10	(35.7%)	3	(9.7%)	13
	Sophomore	1	(3.6%)	0	(0.0%)	1
	Total	28		31		59
Age	19 to 22	13	(46.4%)	5	(16.1%)	18
	23 to 25	11	(39.3%)	9	(29.0%)	20
	26 to 30	3	(10.7%)	7	(22.6%)	10
	Older than 30	1	(3.6%)	10	(32.3%)	11
	Total	28		31		59
Degree	Business Management Systems	7	(25.0%)	3	(9.7%)	10
	Engineering Management	4	(14.3%)	0	(0.0%)	4
	Information Science & Technology	13	(46.4%)	4	(12.9%)	17
	MBA	1	(3.6%)	23	(74.2%)	24
	Mechanical Engineering	1	(3.6%)	0	(0.0%)	1
	Petroleum Engineering	1	(3.6%)	1	(3.2%)	2
	Psychology	1	(3.6%)	0	(0.0%)	1
	Total	28		31		59

Asian or Pacific Islander and White or Caucasian are two primary races for both ERP and MBA class students, as shown in Table 4. However, Asian or Pacific Islander accounts for 53.6% of ERP students and White or Caucasian accounts for 54.8% of MBA class students. English is the native language for the majority of MBA class students (71%) and is the native language (39.3%) and primary language (35.7%) among ERP students.

Table 4 Subject Distribution by Race and English Fluency

Demographic Factors		Discipline				Total
		ERP Class		MBA Class		
Race	Asian or Pacific Islander	15	53.6%	7	22.6%	22
	Black or African American	1	3.6%	4	12.9%	5
	White or Caucasian	12	42.9%	17	54.8%	29
	Hispanic or Latino	0	0.0%	1	3.2%	1
	Do not wish to disclose	0	0.0%	2	6.5%	2
	Total	28		31		59
English Fluency	First/Native Language	11	39.3%	22	71.0%	33
	Primary Language	10	35.7%	3	9.7%	13
	Fluent	7	25.0%	6	19.4%	13
	Total	28		31		59

The majority of ERP students (85.7%) has one to two ERP classes while most students in the MBA class (74.2%) have not taken an ERP class prior to Spring 2017 semester. About one half of students in each class do not have experience using an enterprise information system outside of an academic environment, but more MBA class students (22.6%) than ERP class students (10.7%) have greater than three years' experience using an enterprise system outside of academic environment. Regardless of number of ERP classes and experience in using an enterprise system, about 82.1% of ERP students and 74.2% of MBA class students identify themselves as computer savvy. More ERP students (82.1%) than MBA class students (67.7%) were excited about their respective class. The detailed distributions by variables including number of ERP classes, enterprise system experience, computer savvy, and excited about class are provided in Table 5.

Table 5 Subject Distribution by Number of ERP Classes, Enterprise System Experience, Computer Savvy, and Excited about Class

Demographic Factors		Discipline				Total
		ERP Class		MBA Class		
Number of ERP classes prior to Spring 2017	0 or Not Sure	0	0.0%	23	74.2%	23
	1 to 2	24	85.7%	6	19.4%	30
	3 to 4	3	10.7%	2	6.5%	5
	5 to 6	1	3.6%	0	0.0%	1
	more than 6	0	0.0%	0	0.0%	0
	Total	28		31		59
Years of experience in using an enterprise information systems outside of an academic environment	none or not sure	14	50.0%	17	54.8%	31
	less than 2 years	11	39.3%	7	22.6%	18
	3-4 years	2	7.1%	4	12.9%	6
	5-6 years	0	0.0%	1	3.2%	1
	7-10 years	0	0.0%	2	6.5%	2
	> = 11years	1	3.6%	0	0.0%	1
	Total	28		31	52.5%	
Computer Savvy	Strongly Agree	7	25.0%	8	25.8%	15
	Agree	16	57.1%	15	48.4%	31
	Neither Agree nor Disagree	1	3.6%	3	9.7%	4
	Disagree	3	10.7%	5	16.1%	8
	Strongly Disagree	0	0.0%	0	0.0%	0
	Missing Value	1	3.6%	0	0.0%	1
	Total	28		31		59
Excited about class	Strongly Agree	14	50.0%	7	22.6%	21
	Agree	9	32.1%	14	45.2%	23
	Neither Agree nor Disagree	4	14.3%	5	16.1%	9
	Disagree	0	0.0%	3	9.7%	3
	Strongly Disagree	0	0.0%	2	6.5%	2
	Missing Value	1	3.6%	0	0.0%	1
		28		31		59

5.2 Impact of Immersive Learning Environment on Learning Experience and Course Satisfaction

The first research question investigates the impact of an immersive learning environment on students' learning experience, engagement and course satisfaction. The class project for MBA class students was a case study from the textbook that was used in prior year and was to simulate a traditional project environment. The class project for ERP class students was to simulate an immersive learning environment that each student team operate a simulated company to compete

with other companies in the same industry throughout the entire semester. ERP students learned to setup their company's ERP system and supply chain strategies based on materials covered in class. Furthermore, the same simulation company and scenario were used as the joint project for the interdisciplinary team to provide additional immersive experience. That is, each ERP team learned to communicate and work with their assigned MBA team members who functioned as accountants in the accounting division of their company.

As shown in Table 6, it is statistically significant that the use of a class project improves student learning experience at $\alpha = 0.05$ level as measured by the following learning and course satisfaction dimensions:

- working with the class team was enjoyable
- learnt from working with class team members
- helped understand subject better
- enhanced professional development
- increased instructor-student interactions
- promote active learning

Table 6 Mean Test for the Use of a Class Project

Survey Questions	N	Mean	Std. Deviation	Std. Error Mean	t	df	Test Value = 3			
							Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
Working with the class team was enjoyable	46	4.59	0.777	0.115	13.856	45	0.000	1.587	1.36	1.82
Learnt from working with class team member	46	4.50	0.913	0.135	11.145	45	0.000	1.500	1.23	1.77
Helped understand subject better	46	4.52	1.005	0.148	10.267	45	0.000	1.522	1.22	1.82
Project enhanced professional development	46	4.43	0.981	0.145	9.920	45	0.000	1.435	1.14	1.73
Project increased instructor-student interaction	45	4.18	1.093	0.163	7.228	44	0.000	1.178	0.85	1.51
Project promoted active learning	46	4.48	0.983	0.145	10.200	45	0.000	1.478	1.19	1.77

Scale: 5: strongly agree; 4: agree; 3: neither agree nor disagree; 2: disagree; 1: strongly disagree

Table 7 details hypotheses test results for the use of an immersive learning environment. Specifically, students in an immersive learning environment reported higher degree of subject

understanding, professional development, instructor-student interaction, and active learning than students had in a traditional learning environment. The results are statistically significant at $\alpha = 0.05$ level. However, there is no statistical difference in learning from the project team members or the degree of enjoyment in working with class team members at $\alpha = 0.05$ level.

Table 7 Hypotheses Test Result for Immersive Learning Environment

Project Types	Survey Questions	Discipline	N	Mean	Std. Deviation	Std. Error Mean	t-test for Equality of Means		
							t	df	Sig. (2-tailed)
Class Project (ERP: immersive project environment MBA: traditional project environment)	Working with the class team was enjoyable	ERP	19	4.63	0.831	0.191	0.324	44	0.748
		MBA	27	4.56	0.751	0.145			
	Learnt from working with class team member	ERP	19	4.63	0.761	0.175	0.817	44	0.418
		MBA	27	4.41	1.010	0.194			
	Helped understand subject better	ERP	19	4.95	0.229	0.053	3.015	28.577	0.005
		MBA	27	4.22	1.219	0.235			
	Project enhanced professional development	ERP	19	4.84	0.501	0.115	2.814	38.204	0.008
		MBA	27	4.15	1.134	0.218			
	Project increased instructor-student interaction	ERP	19	4.58	0.769	0.176	2.348	42.305	0.024
		MBA	26	3.88	1.211	0.237			
	Project promoted active learning	ERP	19	4.89	0.315	0.072	2.982	31.099	0.006
		MBA	27	4.19	1.178	0.227			

5.3 Impact of Interdisciplinary teams on Learning Experience and Course Satisfaction

The second research question investigates impact of working in interdisciplinary teams on student learning experience, engagement and course satisfaction. As shown in Table 8, it is statistically significant that working in interdisciplinary teams improves student learning experience at $\alpha = 0.05$ level as measured by the following learning and course satisfaction dimensions:

- Learnt from working with cross class team members
- Improved my understanding of accounting concepts
- Feel comfortable working with technology (MBA) or Business aspects (ERP)
- Improved understanding of technology in accounting (MBA) or business application (ERP)
- Working with cross-class team was enjoyable
- Overall experience in joint project is positive

However, there is insufficient evidence to support that the students communicated with their cross-class team members regularly at $\alpha = 0.05$ level.

Table 8 Mean Test for Working in Interdisciplinary Teams

Survey Questions	N	Mean	Std. Deviation	Std. Error Mean	t	df	Test Value = 3			
							Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Communicated with cross_class team regularly	46	3.11	1.303	0.192	0.566	45	0.574	0.109	-0.28	0.50
Learnt from working with cross class team members	46	3.39	1.341	0.198	1.979	45	0.054	0.391	-0.01	0.79
Improved my understanding of accounting concepts	46	3.89	1.233	0.182	4.901	45	0.000	0.891	0.53	1.26
Feel comfortable working with technology (MBA) or Business aspects	46	3.50	1.169	0.172	2.901	45	0.006	0.500	0.15	0.85
Improved understanding of technology in accounting (MBA) or business application (ERP)	46	3.50	1.225	0.181	2.769	45	0.008	0.500	0.14	0.86
Working with cross-class team was enjoyable	46	3.54	1.242	0.183	2.968	45	0.005	0.543	0.17	0.91
Overall experience in joint project is positive	46	4.26	1.104	0.163	7.744	45	0.000	1.261	0.93	1.59

Other than ERP students reported a more positive experience with the joint project, the other observations do not vary between ERP students and MBA students, as shown in Table 9.

Table 9 Hypotheses Test Result for Mean Difference between ERP and MBA students

Project Types	Survey Questions	Discipline	N	Mean	Std. Deviation	Std. Error Mean	t-test for Equality of Means		
							t	df	Sig. (2-tailed)
Cross class team & joint project	Communicated with cross_class team regularly	ERP	19	3.26	1.240	0.285	0.670	44	0.506
		MBA	27	3.00	1.359	0.261			
	Learnt from working with cross class team members	ERP	19	3.37	1.342	0.308	-0.096	44	0.924
		MBA	27	3.41	1.366	0.263			
	improved my understanding of accounting concepts	ERP	19	3.84	1.302	0.299	-0.225	44	0.823
		MBA	27	3.93	1.207	0.232			
	Feel comfortable working with technology (MBA) or	ERP	19	3.63	1.065	0.244	0.636	44	0.528
		MBA	27	3.41	1.248	0.240			
	Improved understanding of technology in accounting (MBA) or business application (ERP)	ERP	19	3.47	1.073	0.246	-0.121	44	0.904
		MBA	27	3.52	1.341	0.258			
	Working with cross-class team was enjoyable	ERP	19	3.63	1.116	0.256	0.400	44	0.691
		MBA	27	3.48	1.341	0.258			
	Overall experience in joint project is positive	ERP	19	4.89	0.315	0.072	4.326	30.613	0.000
		MBA	27	3.81	1.241	0.239			

5.4 Impact of Personality Traits on Learning Performance and Course Satisfaction

The third research questions investigate the influence of personality traits on students' course performance, engagement and course satisfaction. As each case exhibits five personality traits, a cluster analysis was conducted at four, five, and six cluster settings. A five-cluster is selected based

on the Elbow methods and the cluster centers, distance between clusters, and number of cases in each cluster are detailed in Table 10. Parallel diagrams and radar chart for individual cases and for cluster average are provided in Figure 6. Cluster 1 are individuals who exhibits low degree for each of five personality traits. Cluster 2 are individuals with high degree of conscientiousness and Intellect Imagination (openness), moderate degree of agreeableness and neuroticism, and low degree of extraversion. Cluster 3 are individuals with high degree of neuroticism and moderate on other four personality traits. Cluster 4 are individuals with low to moderate level of neuroticism and high degree on the other four personality traits. Cluster 5 are individuals with low to moderate level of intellect imagination (openness), low to moderate level of neuroticism, moderate level of agreeableness, and higher level of extraversion.

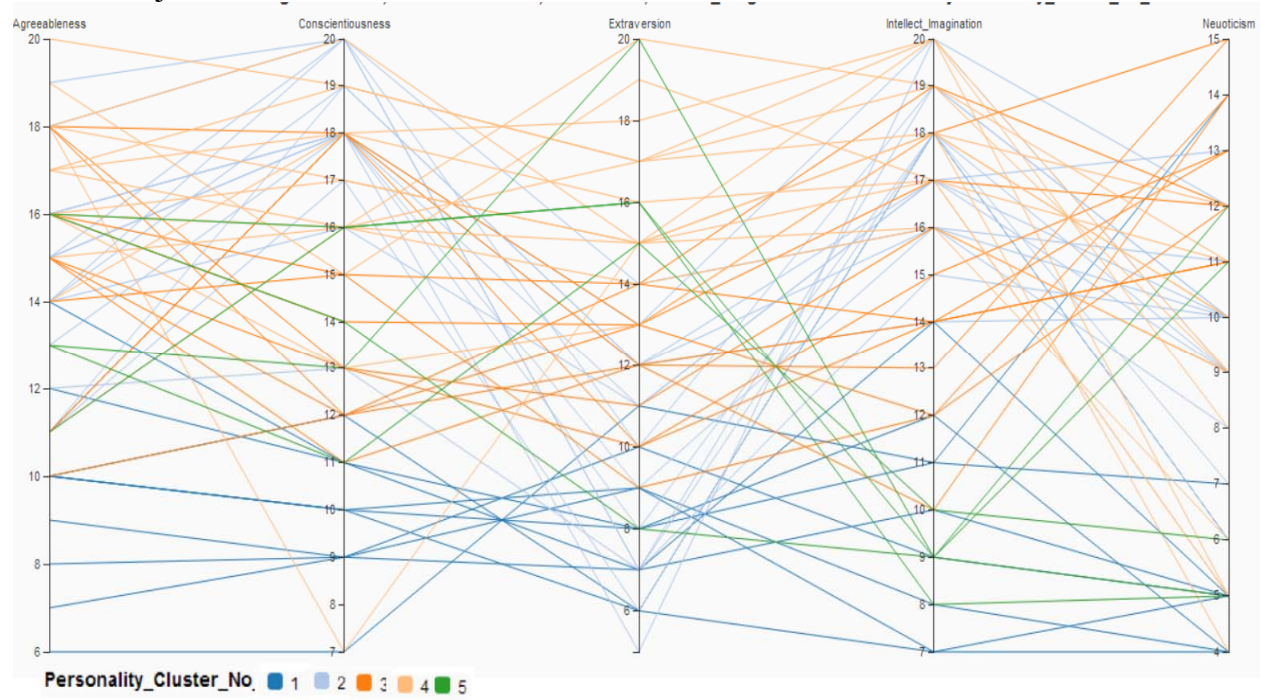
Table 10 Cluster Centers, Distances between Clusters, and Number of Cases

Final Cluster Centers						Distances between Final Cluster Centers					
Personality Traits	Cluster					Cluster	1	2	3	4	5
	1	2	3	4	5	1		12.295	10.954	14.622	9.455
Extraversion	8	10	12	16	15	2	12.295		6.133	7.380	10.915
Agreeableness	10	14	15	17	14	3	10.954	6.133		7.584	7.975
Conscientiousness	10	18	14	16	14	4	14.622	7.380	7.584		9.813
Neuroticism	6	10	13	8	8	5	9.455	10.915	7.975	9.813	
Intellect Imagination	11	17	15	18	9						
Number of cases in each cluster	10	15	12	14	5						

Course grade, project grade, and simulation ranking were used to measure learning performance. A higher number in course grade and project grade and a lower ranking score in simulation ranking represent better performance for a student.

The MANOVA results for hypotheses test are provided in Table 11 and Figure 7. The personality traits have significant influence on an individual's learning performance measured by course grade, project grade, and simulation ranking at $\alpha = 0.05$ level. As shown in Figure 7, students in personality cluster four who exhibit a low to moderate level of neuroticism and high level in all other four personality traits performed better than students in other personality clusters. Students in personality cluster three who exhibit a high degree of neuroticism perform worse in simulation ranking and project than students in other clusters. This finding is consistent with prior literature that neuroticism negatively affects academic performance (Poropat, 2009).

Figure 6 Cluster Analysis Diagram
6a. All Subjects



6b. Average of Cases for Each Cluster

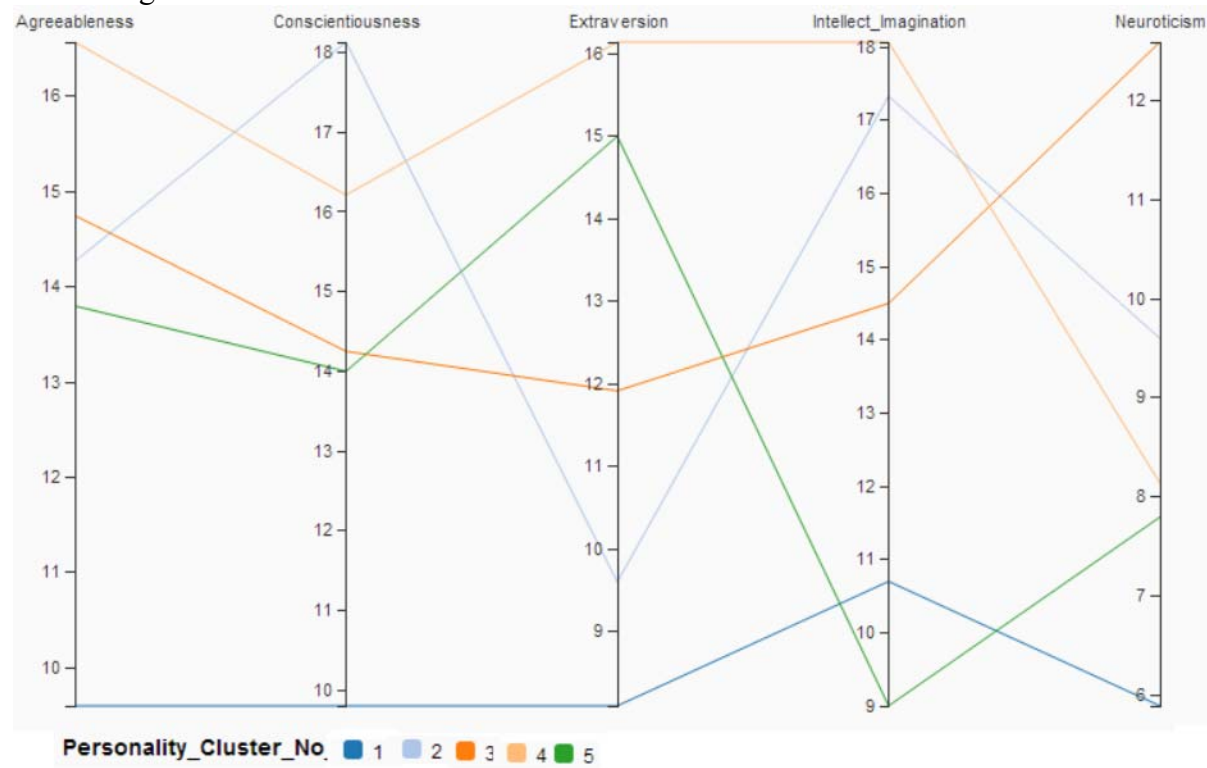


Table 11 Personality Traits Hypotheses Test Results

Multivariate Tests^a						
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.994	2129.031 ^b	3	38	0.000
	Wilks' Lambda	0.006	2129.031 ^b	3	38	0.000
	Hotelling's Trace	168.081	2129.031 ^b	3	38	0.000
	Roy's Largest Root	168.081	2129.031 ^b	3	38	0.000
Personality	Pillai's Trace	0.604	2.523	12	120	0.005
	Wilks' Lambda	0.497	2.544	12	101	0.006
	Hotelling's Trace	0.820	2.507	12	110	0.006
	Roy's Largest Root	0.502	5.022 ^c	4	40	0.002

a. Design: Intercept + Personality

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

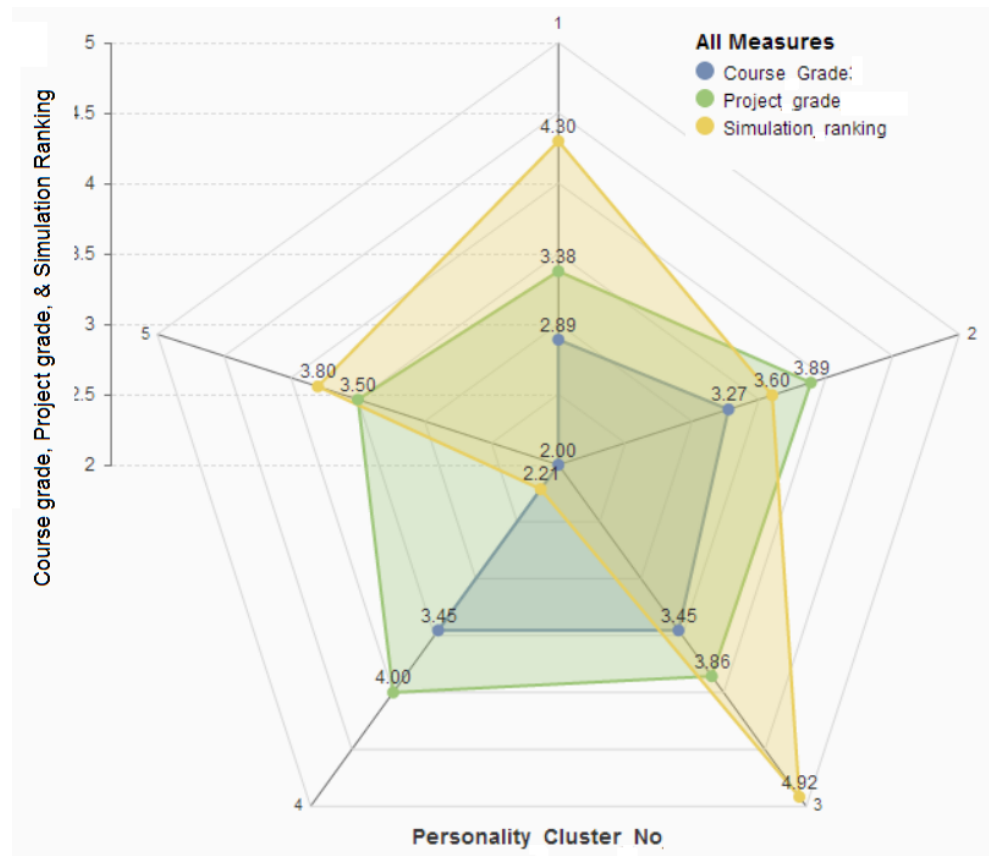
Tests of Between-Subjects Effects						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Course Grade	.046 ^a	4	0.012	2.961	0.031
	Overall Project Grade	.373 ^b	4	0.093	2.831	0.037
	Simulation Competition Rank	41.960 ^c	4	10.490	3.074	0.027
Intercept	Course Grade	24.658	1	24.658	6332.382	0.000
	Overall Project Grade	34.932	1	34.932	1061.603	0.000
	Simulation Competition Rank	562.828	1	562.828	164.950	0.000
Personality	Course Grade	0.046	4	0.012	2.961	0.031
	Overall Project Grade	0.373	4	0.093	2.831	0.037
	Simulation Competition Rank	41.960	4	10.490	3.074	0.027
Error	Course Grade	0.156	40	0.004		
	Overall Project Grade	1.316	40	0.033		
	Simulation Competition Rank	136.485	40	3.412		
Total	Course Grade	33.210	45			
	Overall Project Grade	48.006	45			
	Simulation Competition Rank	859.000	45			
Corrected Total	Course Grade	0.202	44			
	Overall Project Grade	1.689	44			
	Simulation Competition Rank	178.444	44			

a. R Squared = .228 (Adjusted R Squared = .151)

b. R Squared = .221 (Adjusted R Squared = .143)

c. R Squared = .235 (Adjusted R Squared = .159)

Figure 7 Personality Traits vs. Learning Performance



Simulation and project present a collaborative environment. As reported in prior researches (Clark, et. al., 2003, Chamorro-Premuzic & Furnham, 2003; Conard, 2006; Poropat, 2009, Komarraju et. al., 2011), this research also observed that students who exhibit a higher level of both agreeableness and intellect imagination (i.e., cluster 4) perform well than those in personality cluster one and three where students typically have lower levels of both personality traits. The overall course grade also support a similar observation as shown in Figure 8.

As shown in Figure 9, students with an Asian or Pacific Islander heritage often have a high level of neuroticism and moderate level in the other four personality traits. They performed worse in the project and simulation that are collaborative in nature, but outperform others in the overall course grade. Students with Black or African American show a high degree of agreeableness and extraversion, a low degree in conscientiousness and intellect imagination (openness), and moderate level in neuroticism. They perform consistently at average level in project, simulation, and course grade. Students with White or Caucasian heritage often have high level of conscientiousness and

intellect imagination (openness) and moderate level for other personality traits. They perform at the average level for project and simulation, but perform poorly compared to students in other races.

This research also observed significant influence of agreeableness and intellect imagination (openness) on student satisfaction measures listed below at $\alpha = 0.05$ level as MAOVA results shown in Table 12.

- Communicated with cross-class team regularly
- Learnt from working with cross class team members
- Working with cross-class team was enjoyable
- Overall experience in joint project is positive

This observation is consistent with findings from prior literature that intellect imagination (openness) and agreeableness often foster collaborative learning (De Raad & Schouwenburg, 1996, Vermetten, et al., 2001, Poropat, 2009).

Figure 8 Agreeableness and Intellect Imagination (Openness) and Course Grade

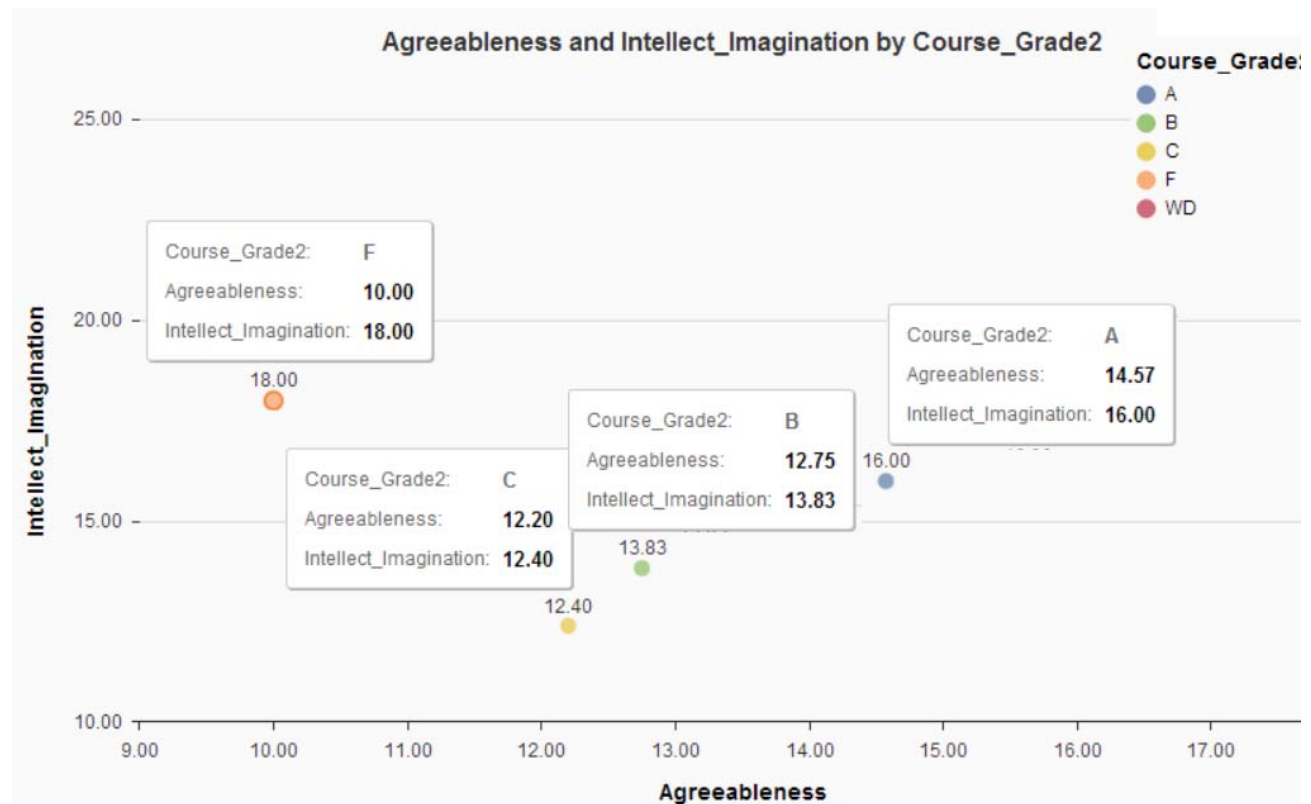
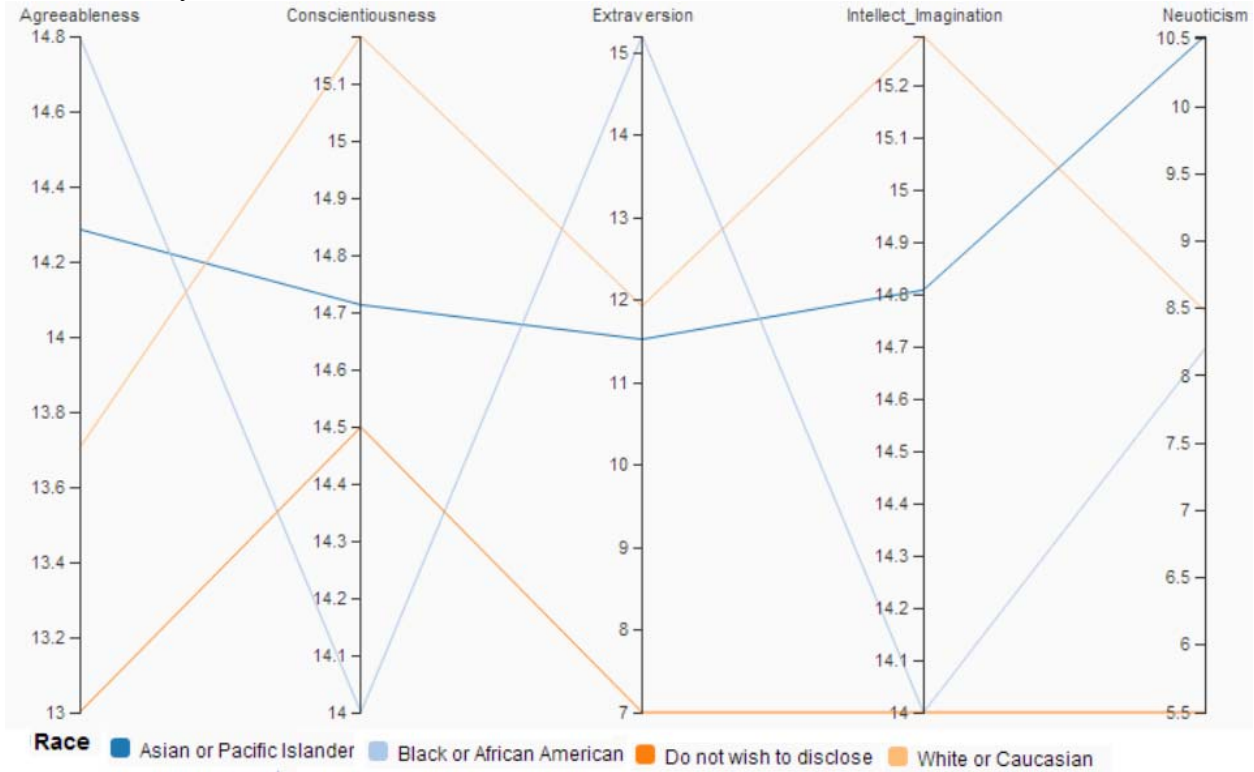


Figure 9 Personality, Learning Outcomes, and Races

9a. Personality vs. Race



9b. Learning Outcome vs. Race

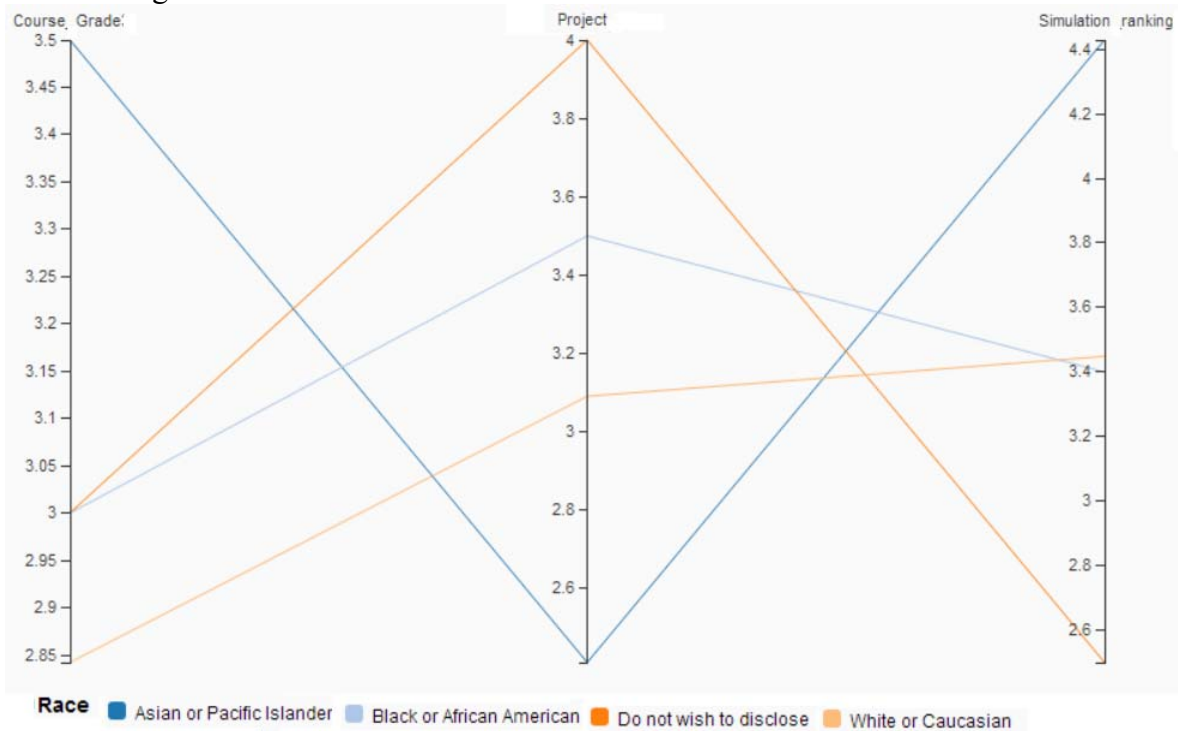


Table 12 MANOV Results of Agreeableness and Intellect Imagination (Openness) on Course Satisfaction Measures

Multivariate Tests ^a						
Effect		Value	F	df	Error df	Sig.
Intercept	Pillai's Trace	0.998	681.525 ^b	4.000	5.000	0.000
	Wilks' Lambda	0.002	681.525 ^b	4.000	5.000	0.000
	Hotelling's Trace	545.220	681.525 ^b	4.000	5.000	0.000
	Roy's Largest Root	545.220	681.525 ^b	4.000	5.000	0.000
Intellect Imagination	Pillai's Trace	2.739	1.448	48.000	32.000	0.135
	Wilks' Lambda	0.002	1.862	48.000	21.299	0.060 **
	Hotelling's Trace	31.847	2.322	48.000	14.000	0.044 *
	Roy's Largest Root	24.890	16.593 ^c	12.000	8.000	0.000 *
Agreeableness	Pillai's Trace	2.867	1.557	52.000	32.000	0.092 **
	Wilks' Lambda	0.001	2.397	52.000	21.476	0.015 *
	Hotelling's Trace	62.786	4.226	52.000	14.000	0.002 *
	Roy's Largest Root	54.484	33.529 ^c	13.000	8.000	0.000 *
Intellect Imagination * Agreeableness	Pillai's Trace	2.331	1.117	40.000	32.000	0.376
	Wilks' Lambda	0.007	1.418	40.000	20.815	0.198
	Hotelling's Trace	17.346	1.518	40.000	14.000	0.201
	Roy's Largest Root	12.426	9.941 ^c	10.000	8.000	0.002 *

a. Design: Intercept + Intellect_Imagination + Agreeableness + Intellect_Imagination * Agreeableness
b. Exact statistic
c. The statistic is an upper bound on F that yields a lower bound on the significance level.
* significant at $\alpha = 0.05$ level
** significant at $\alpha = 0.10$ level

Tests of Between-Subjects Effects						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Communicated with cross_class team regularly	69.300 ^a	36	1.925	4.400	0.017 *
	Learnt from working with cross class team members	72.811 ^b	36	2.023	2.942	0.056 **
	Working with cross-class team was enjoyable	63.244 ^c	36	1.757	3.514	0.033 *
	Overall experience in joint project is positive	49.311 ^d	36	1.370	2.192	0.122
Intercept	Communicated with cross_class team regularly	225.740	1	225.740	515.978	0.000
	Learnt from working with cross class team members	291.514	1	291.514	424.021	0.000
	Working with cross-class team was enjoyable	325.880	1	325.880	651.760	0.000
	Overall experience in joint project is positive	455.157	1	455.157	728.252	0.000
Intellect Imagination	Communicated with cross_class team regularly	28.553	12	2.379	5.439	0.011 *
	Learnt from working with cross class team members	17.687	12	1.474	2.144	0.143
	Working with cross-class team was enjoyable	18.136	12	1.511	3.023	0.062 **
	Overall experience in joint project is positive	5.571	12	0.464	0.743	0.690
Agreeableness	Communicated with cross_class team regularly	33.913	13	2.609	5.963	0.008 *
	Learnt from working with cross class team members	23.876	13	1.837	2.671	0.084 **
	Working with cross-class team was enjoyable	25.887	13	1.991	3.983	0.028 *
	Overall experience in joint project is positive	23.238	13	1.788	2.860	0.071 **
Intellect Imagination * Agreeableness	Communicated with cross_class team regularly	13.461	10	1.346	3.077	0.062 **
	Learnt from working with cross class team members	20.766	10	2.077	3.021	0.065 **
	Working with cross-class team was enjoyable	13.522	10	1.352	2.704	0.086 **
	Overall experience in joint project is positive	7.678	10	0.768	1.228	0.393

a. R Squared = .952 (Adjusted R Squared = .736)
b. R Squared = .930 (Adjusted R Squared = .614)
c. R Squared = .941 (Adjusted R Squared = .673)
d. R Squared = .908 (Adjusted R Squared = .494)

* significant at $\alpha = 0.05$ level
** significant at $\alpha = 0.10$ level

5.5 Pedagogical Project Accomplishments

Several novice, creative and effective professional development activities that engaged students throughout the entire project period. A list of activities is provided in Appendix 4.

The first type of professional development activities is the presentation to and receive feedback from industry judge panel. The business strategy presentation was scheduled after the first joint project assignment and before the first competition to a panel of ten industry judges on March 14, as shown in Figure 10. The industry judge panel provided feedback to each team and awarded simulation fund to finance company operations based on teams' presentation performance and the level of interaction between ERP class students and MBA class students. Student teams gave their final project presentation to a panel of 20 industry judges on May 3, as shown in Figure 11. Most teams have students from both classes participated in both presentations. Presentation requirements and resources/guidelines for interaction with industry judges were provided to students for additional professional development (refer to Appendix 4 and Appendix 5).

Figure 10 Business Strategy Presentation to Industry Judge Panel on March 14, 2017



Figure 11 Final Project Presentation on May 3, 2017



The second novice professional development activity is the mentoring provided by industry panel through team sponsorship and award sponsorship. The instructors took initiative to solicit industry sponsors for various simulation project activities. The instructors successfully secured company mentor sponsorship for all competition teams from Deloitte SAP, Peabody Energy, Monsanto, Novus International, Nextep Technology Solution, and Union Pacific, as shown in Figure 12. Company team mentors worked with student teams to review their competition results and to fine-tune their competition strategies via video conferencing, email communication, and in-person meetings throughout the whole project period.

The live competition mentoring is another novice industry engagement activity designed by the project. The instructors worked to secure a company in an industry or business area relevant to the simulation case for each live competition, as shown in Figure 12. The instructors then worked with company representatives to prepare a list of topics relevant to a particular competition, so they can share their industry practices with students during their visit in their sponsored live competition and events, as shown in Figure 13.

Figure 12 Industry Mentoring Activities

ERP SAP Simulation Competition

[Home](#)

[Sponsors & Judges](#)

[Ranking & Results](#)

- [dashboard \(HTML5\)](#)
- [dashboard \(Flash w/alert\)](#)

[Presentation Schedule \(judging criteria\)](#)

[Team Sponsors](#)

Photos & Videos

[Past Winners](#)

[Overview \(video\)](#)

[What is the competition?](#)

2017: [Investor, 2, 3, 4&5, Presentation & Reception](#)

Schedule

[Timeline](#)

[Championship Schedule](#)

[Simulation preparation](#)

ACT NOW!! [2017 Sponsorship Opportunities](#)

Financial Sponsors:

- 2017 Corporate Team Sponsors (\$200 per team, in alphabetical order of company name): [Deloitte SAP](#) (1), [Peabody Energy](#) (2), [Monsanto](#) (1), [Novus International](#) (1), [Nextep Technology Solutions](#) (1), and [Union Pacific](#) (2).
- Competition 1: 5:15 pm - 6:30 pm, Wednesday, March 15
- Competition 2: 4:00 pm - 5:15 pm, Thursday, March 23: [Investment Realty](#)
- Competition 3: 5:30 pm - 6:45 pm, Thursday, April 13: [Deloitte SAP](#)
- Championship Competition (rounds 4 & 5) sponsored by [Cargill](#)
- 2017 Competition Award Sponsors
 - The Winning team Award: (\$160): [RSM US LLP](#)
 - The Silver Medal team award (\$120): [Centene](#)
 - The Bronze Medal team award (\$80): [Centene](#)
 - Competition team awards (\$40 gifts per team for 4 teams): [Eastman](#),
 - Lean Manufacturing Award: [Union Pacific](#)
 - Best Strategy Presentation Award: [Union Pacific](#)
 - Company gifts for competition teams: Cargill, [Sponsor it](#)

Team Industry Mentors*:

- Business Plan & Investor Panel: Mr. Hugues Belanger, [Enterprise RentACar](#); Mr. Mike Fox, [Accenture](#); Mr. Jeff Marker, [RSM US LLP](#), Ms. Stephanie Thelen, [Salom](#); Mr. John Eash, [S&T Corp. Relation](#); Dr. Edna Grover-Bisker and Ms. Julie Pittser, [S&T COER](#); Dr. Yinfu Ma, [S&T CASB](#)
- Competition 2 Mentors: Mr. Matt Woessner, Vice President, [Investment Realty](#)
- Competition 3 Mentors: [Deloitte SAP](#): Mr. Eric Kase, Mr. Tyler Knobbe, Mr. Matt Roman, Mr. Michael Cordin, Mr. Joel Hensel, Ms. Aditi Mishra, Mr. Chandra Balasubramanian, Mr. Deepak Panda, Mr. Christopher Moody, Mr. Nipun Pratap Singh
- Championship competition mentors: [Cargill](#) Mr. Michael Greening, Ms. Montana Long, and more to be announced

Simulation Project Judge Panel, 4:00 - 6:30, Wednesday, May 3

Industry judge can participate in person, via live WebEx video conferencing, or by reviewing the recordings ([view schedule](#))

Presentation Industry Judge Panel (in the alphabetical order of company names)

Judges: Rolla campus [Be a industry judge](#)

- [AT&T](#): Mr. Ryan Schilling
- BIT Advisory Board: Mr. Darryl Brinkmann (Caterpillar previously)
- [Monsanto](#): Ms. Lorie McMillin
- [Peabody Energy](#): Mr. Richard Feld, Mr. Praveen Patelkhana
- S&T [Career Opportunities & Employer Relations \(COER\)](#): Ms. Julie Pittser
- S&T [Corporate Relations](#): Ms. Linda Fulps
- [College of Arts, Sciences, & Business](#): Dr. Kate Drowne
- ERP & BIT faculty: Dr. Craig Claybaugh, Dr. LiLi Eng, Dr. Bih-Ru Lea, Prof. Yu-Hsien Chiu
- more to announce...

Judges via Web Conferencing or **viewing the recording** [Be a industry judge](#)

- [Accenture](#): Mr. Mike Fox
- [Boeing](#): Mr. Tom Cooper, Mr. Carl Schmitz, Mr. Juwel Khan, Mr. Nick Unnerstall; Mr. Matthew Welch
- [Brewer Science](#): Ms. Rachel Jung
- [Centene](#): Jonathan Freeman
- [Deloitte SAP](#): Mr. Deepak Panda
- [Nextep Technology Solutions](#), [ASUG](#) (Americas' SAP User Group): Mr. Mike Narducci
- [Union Pacific \(UP\)](#): Grant Novak, Mackenzie Wardyn, Pam Shupp,
- more to announce...

* industry mentors participate in simulation runs and provide improvement feedback to teams during company start-up period or during a live simulation run.

Figure 13 Mentoring Activities and Professional Interaction with Industry Experts



Another novice design of the project is a new Student-faculty interaction model that was introduced during the project period. As live competitions were conducted in a learning by doing active learning environment, faculty interact with students in a fun and engaging way, as shown in Figure 14. The subject knowledge that students learned in classroom were reiterated during the competition, so students can see how theories and models can be applied in a real world situation.

One other novice student-faculty interaction model is the student research mentoring. The instructors worked with three students who participated in the simulation competition in different types of research activities using data generated from the project and simulation competition. The instructors designed research activities and topics relevant to each student's responsibilities and tasks in their simulation competition. As a result, students have gained a new perspective of integrating theories and models they learned from classes with research activities.

Figure 14 Active Learning enhanced with a New Student-Instructor Interaction Model



SIGNIFICANCE OF THE STUDY AND LEARNING OUTCOMES ADDRESSED

In addition to the research outcomes that scientifically addressed impact of immersive learning environment, interdisciplinary or cross-functional team structure, and personality traits on student learning outcomes detailed in the Results section, results of this study is significant in pedagogical aspect. Specifically, results from this study have important impacts on student learning outcomes and teaching practices as it successfully coordinated two classes that cover different course contents from two different academic disciplines (i.e., Business and computer information technologies). In summary, students involved in this study from both classes have gained knowledge, skills, and professional development experiences as detailed below:

- Student gained hands-on understanding of the concepts underlying enterprise information systems and managerial accounting through operating a real world like company through an immersive learning environment.
- Students achieved deep understanding of subject knowledge by utilizing active learning, experiential learning, and immersive learning approaches.

- Students gained experience in working in a cross-functional interdisciplinary team and virtual team environment.
- Students improved oral and written communication, and critical thinking skills through working with a group of diversified team members who have different expertise, experience, and background.

Furthermore, the results of this study can address teaching practices and following learning outcomes:

- Provide a generalizable framework to design, implement, and manage cross-functional interdisciplinary teams formed by multiple classes from different academic disciplines.
- Provide a list of novice approaches and processes to seamlessly incorporate and integrate real-world and practical industry experience into academic teaching to bridge as an effort to address the gap between academic and industry. The industry team mentoring process and panel judge system creates an engaging and fun learning environment that can be adopted by our fellow faculty.
- Provide recommendations to fellow faculty on effectiveness of using cross-functional interdisciplinary teams, immersive learning environment, and personality traits to improve interaction and voluntary or self-induced engagement between on-campus students and distance students
- Provide generalizable processes and recommendations in creating an immersive learning environment using computer simulation and gaming theories.
- Improve program retention rate by motivating students to take additional classes in the subject areas
- Improve student satisfaction in a teamwork environment

The researchers investigate only a small amount of data generated and collected from the study and will conduct additional studies to analyze data collected for additional insights. Furthermore, the researchers will seek research funding to repeat the experiment to collect additional data and to generalize research results.

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APPENDIX A PERSONALITY ASSESSMENT

Quiz Instructions

Dear student,

We want to know how students and employees learn and apply their skills when using enterprise systems. There are several benefits and no risks if you choose to participate in this study.

Free Assessments: Personality and aptitude assessments are widely used by employers to select the future workforce. This study will give you a chance to practice taking these assessments at no cost to you and zero risk to your employability.

Individual Feedback: Furthermore, you will receive an individual assessment report with suggestions on where and how to improve. Information will also be made available so you can effectively understand and interpret your results.

Classroom Feedback: The instructor will receive a consolidated report that will allow them to find means and strategies to improve class learning outcomes and provide career guidance to students.

Extra Credit: As a more immediate benefit to participating in this study, your instructor may provide you with extra credit!

Participation in this study is **voluntary**. All information is kept **confidential** and **anonymous**. The research team will only be provided your **data set number** and relevant data by the instructor.

The personality assessment takes 2-4 minutes, and you will have up to 40 minutes to complete the computer aptitude assessment. These assessments can be taken separately, but you must complete both to receive the benefits listed above.

If you are taking **multiple ERP** classes, you can only participate in these assessments **ONCE**. Fill out the assessments in the class that you want the extra credit to apply to.

By submitting this survey, you are agreeing to participate in this study.

Question 1

Please indicate which assessments you would like to receive individualized feedback for.

- ☐ Personality Assessment
- ☐ Computer Aptitude Assessment
- ☐ Both
- ☐ Neither

Question 2

Which class are taking this survey for?

- ☐ ERP 2110 - Introduction to ERP
- ☐ ERP 4220 - Introduction to Enterprise Decision Dashboard Prototyping
- ☐ ERP 5110 - ERP Systems Design and Implementation
- ☐ ERP 5310 - Supply Chain Management Systems in an ERP Environment
- ☐ ERP 5410 - Use of Business Intelligence
- ☐ ERP 4610-6610 Customer Relationship Management
- ☐ ERP 6220 - Data Modeling & Visualization Prototyping for Enterprise Decision Dashboards
- ☐ INFSYS 3841-001/6891-G01 - Enterprise Systems
- ☐ BUS 6224 Managerial Accounting

Question 3

Please indicate the degree to which you agree or disagree with the following statements:

1. I am excited about the ERP class I am in.

[Select] ▼

2. I am excited about using ERP systems.

[Select] ▼

3. I am excited about the field of ERP, computers and technology, or information systems.

[Select] ▼

4. I am a computer savvy person.

[Select] ▼

[Select]

Strongly Agree

Agree

Neither Agree/Disagree

Disagree

Strongly Disagree

Question 4

Please indicate your sex

- ☐ Male
- ☐ Female
- ☐ Other or Do Not Wish to Disclose

Question 5

Please indicate your age range

- ☐ Younger than 15
- ☐ 15-18
- ☐ 19-22
- ☐ 23-25
- ☐ 26-30
- ☐ Older than 30
- ☐ Do Not Wish to Disclose

Question 6

Please Indicate Your Year in School

- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior
- ☐ Graduate
- ☐ Do Not Wish to Disclose

Question 7

Please indicate your major(s). (check all that apply)

- ☐ Information Science & Technology
- ☐ Business & Management Systems
- ☐ MBA
- ☐ Electrical & Computer Engineering
- ☐ Manufacturing Engineering
- ☐ Engineering Management
- ☐ Computer Science
- ☐ Other, please specify in the next question.

Question 8

If you selected other in the previous question - Please indicate what that major(s) is here. Please do **not** include minors or an emphasis.

Question 9

Please specify your race/ethnicity

- ☐ White or Caucasian
- ☐ Hispanic or Latino
- ☐ Black or African American
- ☐ American Native or Alaska Native
- ☐ Asian or Pacific Islander
- ☐ Other
- ☐ Do not wish to disclose

Question 10

Please indicate your knowledge with the English language.

Primary - The language used in most everyday situations

First - Mother tongue, native speaker, first language learned

Note: If English is your first and primary language, simply mark it as First.

Fluent - Capable of using the language with accuracy and participate effectively in most conversations on practical, social, or professional topics

Elementary - Can use the language to buy goods, tell time, order simple meals, and ask for minimal directions

- ☐ First
- ☐ Primary
- ☐ Fluent
- ☐ Elementary
- ☐ Little to no knowledge

Question 11

Please indicate how many ERP classes you have taken before Spring 2017.

- ☐ 0 or Not Sure
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ 7+

Question 12

Please indicate the years of experience you've had using information or enterprise systems (PeopleSoft, SAP, Microsoft Dynamic, etc. outside of an academic environment.

- ☐ none or not sure
- ☐ less than 2 years
- ☐ 3-4 years
- ☐ 5-6 years
- ☐ > 7 years

Question 13

How Accurately Can You Describe Yourself?

Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence.

Indicate for each statement whether it is a Very Inaccurate, Moderately Inaccurate, Neither Accurate Nor Inaccurate, Moderately Accurate, or Very Accurate as a description of you.

I...

1. Am the life of the party. [Select] ▼
2. Sympathize with others' feelings. [Select] ▼
3. Get chores done right away. [Select] ▼
4. Have frequent mood swings. [Select] ▼
5. Have a vivid imagination. [Select] ▼
6. Don't talk a lot. [Select] ▼
7. Am not interested in other people's problems. [Select] ▼
8. Often forget to put things back in their proper place. [Select] ▼
9. Am relaxed most of the time. [Select] ▼
10. Am not interested in abstract ideas. [Select] ▼
11. Talk to a lot of different people at parties. [Select] ▼
12. Feel others' emotions. [Select] ▼
13. Like order. [Select] ▼
14. Get upset easily. [Select] ▼
15. Have difficulty understanding abstract ideas. [Select] ▼
16. Keep in the background. [Select] ▼
17. Am not really interested in others. [Select] ▼
18. Make a mess of things. [Select] ▼
19. Seldom feel blue. [Select] ▼
20. Do not have a good imagination. [Select] ▼

Quiz saved at 9:24pm

Submit Quiz

APPENDIX B: SURVEY ON WORKING WITH TEAM MEMBERS

Please provide feedback on working on the ERP/MBA joint project

5 - strongly agree

4 – somewhat agree

3 - neither agree nor disagree

2 – somewhat disagree

1 - strongly disagree

Highlight the box for your responses

Working with your MBA team members

Working with MBA students in my team was enjoyable	5	4	3	2	1
I learnt from working with MBA students in my team	5	4	3	2	1
The project helped me understand Managerial Accounting better	5	4	3	2	1
The project enhanced my professional development	5	4	3	2	1
The project increased instructor-student interaction	5	4	3	2	1
The project promoted active learning	5	4	3	2	1

Working with the ERP team

I communicated with my ERP team members regularly	5	4	3	2	1
I learned something new from working with ERP students	5	4	3	2	1
Working with real data generated from the joint project improved my understanding of accounting concepts covered in BUS 6224	5	4	3	2	1
The joint project with the ERP class made me feel more comfortable working with technology	5	4	3	2	1
The joint project with the ERP class improved my understanding of technology use in accounting	5	4	3	2	1
Working with the ERP team was enjoyable	5	4	3	2	1
My overall experience with the joint class project is positive	5	4	3	2	1

Other comments:

Note: The above survey was administered to MBA students. A similar survey was administered to ERP students with the first section of the survey on Working with your ERP team members, and second section on Working with the MBA team.

APPENDIX 3 SIMULATION PROJECT FEEDBACK SURVEY: ERP STUDENTS

Please provide feedback for your participation of the 2017 ERP Simulation Competition. It is very important that you provide a response to all questions, so we can make improvement based on your feedback. All responses will be kept confidential and will be used solely to improve our education programs, student engagement and learning experience, and active learning process to support Missouri S&T's experiential learning initiative.

Please contact Dr. Bih-Ru Lea (leabi@mst.edu) or Dr. LiLi Eng (engl@mst.edu) for any questions.

Please indicate the reason(s) for your participation in the 2017 ERP Simulation Competition. Please check all that apply.

Please indicate the reason(s) for your participation in the 2017 ERP Simulation Competition. Please check all that apply.

Required by ERP 6120 ERP System Configuration	My friends asked me to join their team
Required by BUS 3220 Managerial Accounting	My professor(s) encouraged me to participate in the competition
Required by BUS 6224 Managerial Accounting & Control	I like to have the opportunity to represent Missouri S&T to compete in the International Competition.
I am interested in the competition	Other

<Next/Submit>



Please indicate your 2017 Simulation Company ID (e.g., AA, BB, GG, FF)

Please indicate your opinion working with your own ERP team members for each statement listed below:

Please indicate your opinion working with your own ERP team members for each statement listed below:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Working with my ERP team members was enjoyable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I learned from working with my ERP team members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ERP simulation project improved my understanding of ERP system and concepts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ERP simulation project enhanced my professional development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ERP simulation project increased faculty-student interaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ERP simulation project promoted active learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate your opinion working with the MBA team assigned to your team for each statement listed below:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I communicated with my MBA team members regularly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I learned something new from working with MBA students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with real data generated from the joint project improved my understanding of accounting concepts covered in ERP 6120	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The joint project with the MBA class made me feel more comfortable with business aspect of technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The joint project with the MBA class improved my understanding of business applications of an ERP system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with the MBA team was enjoyable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My overall experience with the 2017 ERP Simulation Competition is positive.

Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
----------------	----------------	----------------------------	-------------------	-------------------

Please enter additional comments below:

Please enter your name in place of your signature below.

First Name	<input type="text"/>
Last Name	<input type="text"/>

<Back>

<Next/Submit>

APPENDIX 4 PROFESSIONAL DEVELOPMENT ACTIVITIES AND SIMULATION PROJECT TIMELINE

2017 ERP Simulation Competition Timeline

- 4 pm, Wednesday, Feb. 15 (ERP 6120 teams) or 4 pm, Thursday, March 2 (undergraduate teams): Quarter 1 plan submitted to Dr. Lea for approval
 - Your team quarter 1 production plan MUST be approved by Dr. Lea before your simulation company is released for setup. So, submit your plan as early as possible.
- 5:30 - 6:45 pm, Thursday, Feb. 23: Toomey 251, Company setup workshop 1
- 5:30 - 6:45 pm, Thursday, March 2: Toomey 251, Company setup workshop 2
- 4 pm, March 7 – 12 noon, Sunday, March 12: company setup period (implement team strategies using transactions learned from workshop 1 and workshop 2 to simulation client)
- Sunday, March 12: Simulation client verification
 - Your productions must be the same as you have proposed for quarter 1 (i.e., you make all quarter 1 products proposed, Marketing investment, production improvement investment prior to Q1 simulation run).
- 8 am, Monday, March 13 – 12 noon, Tuesday, March 14: Simulation client correction period for teams that have errors
- (Optional) 10 minutes for each team on March 14: Investor Presentation: your team can receive additional capital and stock investment. Registration and Details [HERE](#)
- 7 pm, Tuesday, March 14 – 5 pm, Wednesday, March 15: simulation client locked for verification
- 5:15 – 6:30 pm, Wednesday, March 15: R1 simulation Competition (Fulton 107A, at least 3 team members to compete)
 - First 25 minutes (Day 1 - Day 8) of Quarter 1 competition is a static run based on your quarter 1 plan. You can only view different reports and monitoring market condition during the simulation (i.e., you cannot perform forecast, change price, issue purchase orders, etc.).
 - Last 25 minutes (Day 9 - Day 20) of quarter 1 competition is a dynamic run that your team will operate your company to compete (e.g., making forecast, issue purchase orders, release production orders).
- 4:00 – 5:15 pm, Thursday, March 23: R2 Competition hosted by [Investment Realty](#) (BCH 115 Lab (Civil Eng. building, at least 3 team members to compete)
 - Round 2 is a dynamic run. That is, your team will have to make forecast, procure materials, produce products, and implement your marketing strategies in addition to review reports and monitor markets during the game.
- 5:30 – 6:45 pm, Thursday, April 13: R3 Competition hosted by [Deloitte SAP](#) (Toomey 251, at least 3 team members to compete)
 - Same setup as Round 2
- 10:30 – 1:30 pm, Friday, April 28, R4 and R5 Competition hosted by [Cargill](#) (Heavner Center Atrium, at least 3 team members to compete)
 - Same setup as Round 2, but public can invest into your company during the simulation period
- 4 pm – 5:30 pm, Wednesday, May 3: Team Presentation to Industry Judge Panel
- 5:40 pm – 7 pm, Wednesday, May 3: Award Ceremony and Networking with Industry Judge panel (individuals must participate in at least 2 live simulation runs to qualify for the network event)
- April – May: International Qualification Runs
 - The overall 2017 winning team will represent S&T to compete at the international qualification runs
- May – June (tentatively): International Competition if placed in top 10 from the qualification runs

APPENDIX 5 BUSINESS STRATEGY PRESENTATION INSTRUCTIONS AND STUDENT RESOURCES

ERP Simulation Team Strategy Presentation

Judge Panel: _____

Registration Deadline: **12 noon, Friday, March 10**

Presentation Date: **10 minutes per team between 2:45 pm and 4:15 pm on Tuesday, March 14**

Please sign up a presentation time if your team would like to present your strategy to an Industry Judge panel (refer to | comments from Mr. Darryl Brinkmann [HERE](#)). A team must have at least 3 participating members to be eligible for an investor presentation (distance team member can participate through WebEx, recorded video, and call-in)

Location: [Hasselmann Alumni House](#)

Dress Code: Your team's decision

Instructions:

1. Please email your presentation file to Dr. Lea **by 8 am, Tuesday, March 14** (alternatively, your team can use Google Slide for presentation and share the slide with Dr. Lea (leabi@mst.edu) without sending a physical file)
2. Your presentation will be loaded into the computer prior to your presentation.
3. You (and your company sponsors) are **NOT ALLOWED** to attend or view presentations of other teams.
4. Please arrive 2-3 minutes prior to your scheduled presentation time. Wait until your team is called.
 - Each team will have a total of 10 minutes to present the team's business competition and winning strategy (some tips provided [HERE](#)) to the industry advisory board for funding/investment and to receive feedback. So, manage the presentation as you were giving an elevator pitch (examples [HERE](#)). It is suggest that you reserve 2 -3 minutes for feedback.
 - **100,000 euros will be awarded to presentation teams with both ERP/IST and MBA members!!**
 - All judges will listen to all registered team presentations. Each judge can invest up to 1 million euro (simulation money) to one or up to three completion teams.
 - A judge may select a team to be the team's mentor for the course of simulation period (March to May 2017)
 - Please inform Dr. Lea to setup a WebEx session if your distance student can participate in the investor presentation (please only login 2 minutes prior to your team's scheduled time. Please note that it is unethical to listen to other team's business plan and strategies.).

Other resources/information

- Simulation news/update at <http://web.mst.edu/~msdnaa/simulation> (prior and current photos, performance, company sponsors, judges, etc.)
- [2017 Simulation Competition Timeline/Schedule](#)
- [Simulation Skill Assessment & Participation Worksheet](#)
- [Simulation Case Overview video clip](#)
- [Live simulation video clip](#)

APPENDIX 5 FINAL PROJECT PRESENTATION INSTRUCTIONS AND STUDENT RESOURCES

plazza 2017 ERP Simulation Competition Discussion Board A Resources Statistics Manage Class

company_setup_q&a round1 round2 round3 wespy_report other investor_panel_presentation project_presentation

New Post Search or add a post...

Filtering by: project_presentation

WEEK 4/30 - 5/6

Instr **Simulation Project presentat...** 4/30/17
Project presentation: WeSpy Reports, Investor Panel presentation, & more... Project presentation schedules: BUS 622

Instr **Project presentation: WeSpy...** 4/30/17
Project presentation schedules: BUS 6224: 4-6 pm, Monday, May 1 ERP 6120 & Simulation Undergraduate teams: Wednesday,

Project presentation schedules:

- BUS 6224: 4-6 pm, Monday, May 1
 - ERP 6120 students are **STRONGLY** encouraged to attend your BUS 6224 team members' presentations and learn how two different divisions can work together as in a real world work environment.
- ERP 6120 & Simulation Undergraduate teams: Wednesday, May 3
 - BUS 6224 students are strongly encouraged to join your ERP 6120 and undergraduate team presentations, award ceremony, and reception to learn how IT and Accounting are interconnected in today's business environment.
 - Industry judges to be updated and can be viewed by click **Sponsors & Judges** link on <http://web.mst.edu/~msdnaa/simulation>
 - 4-5:45 pm: Presentation schedule: click on **Presentation Schedule** link at <http://web.mst.edu/~msdnaa/simulation/> (judge grading criteria [HERE](#))
 - 5:45 - 6:00 pm: Award ceremony
 - 6:00 - 6:30 pm: Receptions and networking session with industry panel

Resources for your presentations:

- WeSpy reports for all rounds can be downloaded [HERE](#).** You are encouraged to analyze data to identify success factors and causes of failures as those are the most important learning lessons from the project.
- A few presentation tips [HERE](#).**
 - You are strongly recommended to include a photo of each team member in your presentation file, so judges can remember who you are.**
- Teams competition performance data
 - Click on **Ranking & Results** link at <http://web.mst.edu/~msdnaa/simulation/>
 - Interactive dashboards:** choose a dashboard link (HTML 5 or Flash version) at the <http://web.mst.edu/~msdnaa/simulation>. Note that Flash dashboard version has color incorporated into the performance view.
- In preparation for your final project presentation for both **BUS 6224** and **ERP 6120**, you are encouraged to review the investor panel presentations given to our industry judge panel from different competition teams on March 15. You may find out success factors and strategies utilized by your competitors, discover areas that your team can improve, identify root cause(s) of your competition performance, and identify means to improve your presentation skills.
 - The presentation video can be viewed [HERE](#).**